at the end of this period, there is no improvement, such treatment might as well cease.

It is always a good precaution to have the patient's teeth carefully looked after before treatment is instituted. During the treatment a borax mouth wash should be used, and the patient not allowed any dietary indiscretions, although special dieting is not necessary. It is also advisable to take the patient away from all work, hospital treatment being the best. A hot pack, given about two or three times a week, will aid in the absorption of the mercury.

It has been my experience that whenever any benefit has been obtained, it has been the result of the use of mercury, and not of iodides. Even in the specific manifestations which come on many years after the infection, mercury is the only drug which will be of benefit. Iodides probably do good, and should be given either in conjunction with the mercury or, better still, after the mercurial treatment. It is a good plan to give them in increasing doses, 50 to 70 grains a day being quite enough. The habit of giving large doses of iodides is quite prevalent in this country, while abroad smaller doses are the rule.

THE NEURASTHENIA OF AUTO-INTOXICATION.

By Thomas J. Orbison, M.D.,
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The symptom-complex of neurasthenia may be likened to a fairly well-defined body of water fed by many underground channels that in their turn flow from hidden sources. One of the largest of these tributaries is heredity, which is fairly well charted. Besides this there are, doubtless, many others. Of these I believe a very important one, indeed, has its source in gastro-intestinal auto-intoxication.

There are two ways by which man may be poisoned—either by a poison from without or by a failure to get rid of the poisons that are formed inside him, provided it is possible for the body to take them up again.

That neurasthenia may be caused by the former has been accepted. Can it be induced by the latter? Before answering this it will be necessary to answer the following questions: Does the body form poisons within itself? If so, where may they be found? May they be taken up again into the body owing to a vicious condition of the bodily hygiene or a pathological condition of certain secreting surfaces? If they may be so taken up, will they give rise to the symptom-complex of neurasthenia?

On the one hand Oppenheim[1] distinctly and explicitly stands for the negative. He says: "The opinion that this disease (neurasthenia) is due to auto-intoxication resulting from disease of the gastro-intestinal tract does not seem to me to be sufficiently well established." He does not even refer to the urinary findings and their relation, in neurasthenia, to intestinal putrefaction

There is a middle ground to this subject, where many teachers are found. Osler[2] does not mention auto-intoxication as a cause of neurasthenia. Like Oppenheim he seems to look upon neurasthenia as a disease of the mentality caused by worry, overwork, and the like; or else the neurasthenic condition is produced by certain poisons from the outside—such as morphine, cocaine, and alcohol. He refers to gastro-intestinal neurasthenia as nervous dyspepsia and says it is due to worry or nerve tire. No mention is made of the urinary findings in the disease or the fact that they may point the way to one of its causes. Musser[3] does not mention any connection between neurasthenia and auto-intoxication, nor does he deny it.

Bouchard[4] as distinctly affirms as Oppenheim denies that auto-intoxication is an important cause of neurasthenia. So much for the academic side of the question.

Does the body form poisons within itself?

Referring to indicanuria, Musser quotes von Jaksch who states that large quantities of indican in the urine imply that abundant albuminous putrefaction or putrid suppuration is in progress in the system. Musser adds that it must not be forgotten that indicanuria will often arise in simple constipation. Osler tells what indicanuria is, states the origin of the indican and says it is a product of the decomposition of albumen under the influence of bacteria. He leaves the subject there.

Boas[5] quotes Jaffe, Salkowski, Bauman, Brieger, and Senator to prove that indican in the urine is derived from the intestines and is a normal product, but becomes pathological in excess. It is normal from 5 to 20 mg. daily; pathologically, it may reach 100 to 150 mg. Nothnagel[6] quotes Jaffe, who observed that obstruction of the small intestine causes marked increase of indican. Constriction of the large bowel does not cause so much increase. Indican is increased in diarrhœa as well as in constriction and constipation due to bowel stasis, provided the small intestine is at fault, that is, in typhoid when there is disorder of the mucosa, and in other diseases confined or localized in the small intestines. Ortweiler found that increased peristalsis alone does not necessarily cause increased indican in the urine, and may cause its absence owing to the sweeping away of the putrefactive material in the intestines.

From all of this it seems certain that the body does form poisons within itself. What are these poisons and may they be taken up by the body instead of being expelled as they should be?

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[1] Diseases of the Nervous System.

[2] Practice of Medicine.

[3] Medical Diagnosis.

[4] Auto-intoxication in Disease.

[5] Diseases of the Intestines.

[6] Diseases of the Intestines.

Bouchard has isolated seven distinct poisons in the urine alone, and shows their action on living tissues. He proves the toxicity of the blood itself in its capacity of carrier of the poisons to the various excretory organs. He convicts the bile of a tremendous toxicity. Graphically, he gives the relative toxicity of urine and bile and shows mathematically that "if all the bile secreted by the liver passed directly into the blood of a man he would be poisoned by his own bile in less than nine hours. If all the urine that his kidneys secreted passed directly into the blood he would be poisoned by his own urine in two days and six hours." He goes minutely and exhaustively into the subject of auto-intoxication, and leaves not a doubt of it in the reader's mind. Müller and Ortweiler consider it certain that the absorptive faculty of the bowel plays the prominent part in the transfer of poison to tissue.

It seems, then, that the body does form poisons within itself, that they may be found in the urine, bile, venous blood (especially just before it gets to the liver), and in the arterial circulation itself; likewise, that these poisons have been taken up from the gastro-intestinal tract and are constantly in the process of being excreted by the various emunctories. In the healthy man compensation is balanced; the out-go equals the amount formed. But, if any one or more pathological conditions exist—a failure to throw off the various poisons in adequate amounts, loss of the integrity of some mucous surface, stasis in the small bowel from any cause, an excessive intake of vicious material—what then occurs? The intestinal tract is an ideal laboratory for the growth of bacteria. It is a flexible tube, accessible at both ends, kept at a certain temperature and filled with the materials suitable for putrefaction. A large section of it is lined with a secreting surface. It does not take much imagination to picture the condition of the man who is absorbing more of these various poisons than be can throw off. The symptoms would naturally vary in degree and severity according to the individual's personal equation, the excess of poison, and the susceptibility of his tissues.

While it would be ridiculous to assert that every neurasthenic is such because of absorption of toxic material, in other words that auto-intoxication is its only cause—yet it does not seem ridiculous to claim that very many neurasthenics are such wholly or in part owing to auto-intoxication, when we realize the chances at hand for inducing this condition and consider what the results of it would naturally be. This hypothesis is confirmed and strengthened by clinical experience. In this connection I wish to cite an instructive case:

CASE I.—C. P., was twenty-nine years old when he came to me. His occupation is sedentary, although he gets plenty of out-of-door exercise. His family history shows a distinct mental taint on the maternal side. Otherwise the history is good.

He had pleurisy, scarlet fever, and typhoid fever fourteen, eleven, and eight years ago, respectively. Coming, as they did, in the time of his adolescence they may have had a good deal to do with his case as predisposing factors. His general health, other than these, has been good up to about two years ago. There is no history of venereal disease or sexual excess. He has enjoyed plenty of out-of-door exercise—especially rowing and walking.

For about two years he has complained of not feeling well. When asked to be more explicit he said he felt sleepy most of the time, complained of a lack of tone and inertia associated with mental heaviness, constant fagged-out feelings, fulness in the head, and a generally tired-out feeling. He cannot exert himself or do things with any degree of enthusiasm as he would like to do and used to do. He has headaches and neuralgias. He becomes very much depressed at times and does not feel the normal mental exhilaration and joy of life he was accustomed to feel. He has no cause for worry and his work is not exhausting. His bowels are generally constipated. He says he has noticed a lump in the right abdominal region that varies in size from time to time. He has gone the rounds of physicians and has been treated accordingly.

His condition has been diagnosticated neurasthenia, hysteria, general nervousness, and hypochondriasis by competent observers of repute. He says that if his present condition should continue much longer he would feel that life would be too much of a burden.

His muscular condition is excellent—no flabbiness, no pendulous abdomen. The heart and lungs are normal. There is no abnormal position of any of his organs. The tendon reflexes are active but not exaggerated. He exhibits a pretty constant series of habbit spasms, especially of the orbicularis palpebrarum and facial muscles. These express themselves at times as grimaces and are bilateral. There seems to be a desire to keep certain of the eye muscles on the stretch. He has had a number of attacks of sciatica and as a result there is some spinal curving. Peristalsis is sluggish as demonstrated by the phonendescope. Rectal examination shows some dryness of the contents and a good deal of adhesion of fecal material to the bowel walls. The sphincter muscles are exceedingly active and over-tense. The eyes were examined by Dr. J. T. Carpenter who reported that the examination was negative as far as it showed no adequate cause for his nervous condition.

The examination of the urine was negative as far as the ordinary clinical technique goes and showed no abnormality.

Here was a case of, so-called functional, neurasthenia; it had the symptom-complex without adequate anatomical findings to account for them, apparently.

The treatment was directed at the condition of constipation. The result was good, as far as it went; some increase in weight, a better hygienic condition of the bowels and kidneys. It was not satisfactory, however, as no definite demonstrable cause for his trouble had been found.

A more extended examination of his urine was made and at once pointed to the real cause. There was a report from the Philadelphia Clinical Laboratory of "very high quantity of indican for normal twenty-four-hour quantity of urine." He was passing about fifty ounces daily. Thus, it was pointed out, there were two large causal factors in the case to be considered—heredity and auto-intoxication.

Another physical examination was made to find, if possible, any anatomical basis for bowel stasis or obstruction. The abdominal lump was recalled and the patient directed to return at its next reappearance. This he did and a movable, balloon-like tumor was marked out in the region of the appendix. It was partially collapsible, but not entirely removable by palpation. Two high enemas were injected to clear out the lower bowel and aid the examination. The notes read "the water ran in easily traversing the descending, transverse, and ascending colon in turn arriving at the cecum. After the water was evacuated examination showed an irreducible mass in the region of the appendix. The bowel was flattened and the mass distinctly felt rolling under the fingers." Subsequently, four examinations of the urine exhibited indican in excess.

The facts were these. There was a constriction in the neighborhood of the appendix resulting in bowel stasis. This was considered sufficient to set up intestinal putrefaction with absorption of the resulting poisons; these, in turn, were held responsible for his neurasthenic condition.

Dr. John Gibbon was consulted. His examination fully upheld the diagnosis and his opinion was that the nature of the obstruction was the presence of adhesions in the appendicular region. We held to this although there was no history of appendicitis or acute pain in that part of the abdomen. A second examination was made a month later and the same condition found.

Operation was advised and carried out. The notes of it include the following: "The bowel and appendix were exposed. The latter was long, twisted, and bound to the former by adhesions. The bowel was much constricted by these adhesions. Nothing else was found to be abnormal; the kidney and gall-bladder were in a good position. Adhesions were broken up and the appendix removed. The tip of it was quite injected with hemorrhagic spots, but otherwise normal. In addition to the operation the sphincter ani muscle was thoroughly stretched. Just prior to the operation a differential blood count was made in the Pennsylvania Hospital laboratory; this was normal. Nine days after the operation the urinary indican was about normal. One year later the report is: "Examination of the urine shows no excess of indican." The patient is feeling like a new man and has recovered entirely his joy of living, enthusiasm, and right feeling—and he has not changed his occupation or mode of life, except that his bodily hygiene is kept as it should be.

This is the record of a case of neurasthenia due to auto-intoxication. It had persisted for years until the cause of the auto-intoxication was removed and then cleared up.

I have appended eight cases (including the one herein enlarged upon) of neurasthenia occurring in private practice in Philadelphia, in which the symptoms pointed to auto-intoxication and the diagnosis was corroborated by the urinary findings. Of these two have been cured and are entirely free from symptoms. One may be called very much improved—in this case there have been no symptoms for some months, but this is hardly long enough to enable one to claim a permanent cure as yet. Three have been improved by a course of treatment directed against the condition of bad bodily hygiene. Two have not been under treatment long enough to make any claims as to results. There is great satisfaction in finding a tangible cause for these cases that are without anatomical findings—a sign post that may point in the direction of health to many otherwise chronic cases.

One point in addition to this question is pertinent: Why is it that, when the urinary findings begin to indicate that the poisons of putrefaction are no longer excessive, the neurasthenic condition continues, in many cases, for a long time? I wish only to touch on one point relative to this—on the withdrawal of a poison that has been absorbed for a long time, the nerves seem to cry out in distress. This is a common experience and may have some bearing on these cases.

Case II.—M. J. O'M. Male, aged thirty-five years, occupation architect and builder. Generally very healthy. He has been a regular but never an excessive drinker of alcoholics, an excessive smoker for years, and inclined to worry over trifles even though his business has prospered.

In February 1906, following a spell of continuous hard work, he began to feel tired, irritable, and unable to do his work satisfactorily. This was associated with a nervous dyspepsia and backache in the lower dorsal region. He was possessed by terrors of various kinds, especially if left to himself. His heart would palpitate easily and that would increase his fear.

His weight is 174½ pounds. General physical condition is good. His abdomen is pendulous, and there is a slight lateral curvature of his vertebral column. All his reflexes are exaggerated and jerky.

Report of urinary examination by the Philadelphia Clinical Laboratory: "Indican is high for normal twenty-four-hour amount of urine; otherwise normal."

Treatment consisted in correcting the spinal asymmetry and over-coming the sluggish tendency of the bowels by massage, medication, rest, and change of scene. He has become entirely well.

CASE III.—Mrs. C., aged forty-three years. Father died of nephritis and cirrhosis of the liver. Her mother has diabetes. Pneumonia at ten years of age; diphtheria twice; whooping-cough and measles during early childhood.

As a young girl she was very active and easily overwrought. When about eighteen years old she had nervous prostration. Since then she has had attacks of nervous dyspepsia. She has grown quite stout in late years. During the last six months she has had persistent constipation, mental depression, intense lassitude, and headaches; gets tired upon slight exertion. With this there has been a harrassing fear of being alone or in the country and a feeling that she must be constantly on the go even though felling tired out.

Weight 185 pounds (30 pounds too much). Abdomen pendulous and abdominal muscles flaccid and atonic. Conjunctivæ are congested and icteric; tongue coated. Reflexes are very jerky.

Urinary examination by Philadelphia Clinical Laboratory, November 8, 1906, showed: "Total amount of twenty-four-hour urine 500 c.c.; marked increase in indican; slight increase in phenol; total sulphates equal 1.33 grams; conjugate sulphates equal 0.177 gram; preformed sulphates equal 1.153 gram; ratio of preformed to conjugate equal 6.5 to 1; normal ratio is 10 to 1."

Although there was no *actual* increase here in the amount of sulphates excreted there was a relative increase in the conjugate over the preformed. This goes hand in hand with increase in indican and phenol and helps to confirm the diagnosis of intestinal putrefaction.

Treatment consisted in correcting the intestinal sluggishness, by intestinal antisepsis, appropriate diet and exercises, together with massage.

The report of urinary examination, January 15, 1907, was normal except a slight deficiency in amount; she had increased the amount from 562 to 900 c.c. Her general condition was better in every respect. Her weight fell from 185 pounds to 174¾ pounds. There is yet a good deal to be done before she feels normal—habits to overcome, etc.

CASE IV.—Mrs. B., aged twenty-eight years. Father died of fatty degeneration of the heart. Her mother is of a distinctly hysterical make up and always has been. Even when Mrs. B. was a child her mother made no attempt to control her outbursts. She was born at seven months. Has always been constipated. As a child she craved "sweets" and was allowed to eat them at will. She has never been robust though she has never been severely ill. She was married at twenty-one years of age and become pregnant three years later; during her pregnancy she felt better in every respect.

From childhood she has suffered from apprehensions. Has always been very impressionable and in later years this has led toward hypochondria. At times she has the feeling of a tight-band about the head; she becomes very depressed and weeps easily. There have never been true delusions or hallucinations, although about six years ago she began to be suspicious. This passed away. She is very thin. Her abdomen is pendulous. The left kidney is much too low. Heart and lungs are normal. Reflexes are generally somewhat increased. There are no hysterical stigmata other than the "fillet."

Examination of urine shows a trace of albumin and indican in excess; otherwise normal.

CASE V.—Mrs. B., aged forty-one years. Mother died of gastro-hepatic intestinal disease. Father died of a complication of grip, erysipelas, and senile dementia.

Was married at twenty-two years of age; before this she was always healthy. Since the birth of her first child she has never been well. She had five pregnancies in eight years. About one and one-half years after the birth of her last child she had purulent salpingitis and was operated upon; both tubes and ovaries were removed. She was in bed eighteen months. At this time she was dropsical. It was several months later when she began to walk about. Shortly after she began to walk she developed hystero-epilepsy. During some of the attacks she would fall and has broken various bones. These lasted for nine years after which their character changed—at times she has intense pseudo-angina following the attack, at other times she comes out of them quietly. About this time she developed marked dyspeptic symptoms with constipation. For the last three years she has had constipation and diarrhœa in turn. When constipated there is intense headache with nausea and vomiting associated with scanty urine. After the diarrhœa there is free micturition and relief from headache. She complains of mental depression, inability to attend to her household duties, and intense headaches. There is considerable ballooning of the bowels at times.

Examination of urine showed indician "high for twenty-four-hour amount."

Treatment was directed against the intestinal putrefaction with the result that she no longer has the epileptoid attacks, is almost entirely free from her headaches, and is able to attend to her duties. I showed this woman to Dr. Wm. G. Spiller, who concurred in the diagnosis of hystero-psychic-epilepsy with intestinal auto-intoxication as its basis.

CASE VI.—Mrs. C., aged thirty-eight years. Good as to health; both parents were emotional. She was perfectly well up to fifteen years of age when she had a "nervous breakdown." This was characterized by unreasoning fears of various kinds. There were no hallucinations or delusions. She had fits of depression and crying. This lasted about one year and there were hysterical stigmata exhibited, that is, spells of apparent unconsciousness that were not epileptic. She was married at eighteen years of age; has never been robust since. At times she will feel quite well and then have a period of nervousness and mental depression. She complains of lassitude, tired feelings, mental depression, and fear—fear of crowds and being alone. Her mode of life does not account for them—there is no apparent cause. Her symptoms have been more severe for the last two years. Her bowels have been very irregular up to two months ago; since then they have been regulated by internal treatment. Sleep is very unsatisfactory and appetite poor.

General physical condition is good. Eyes are watery. Conjunctivæ are hypesthetic. Reflexes are exaggerated. Heart and lungs were normal.

Examination of urine at the Philadelphia Clinical Laboratory shows a trace of albumin and indican high for twenty-four-hour amount of urine. Otherwise it was normal.

Treatment was directed against the intestinal putrefaction and urinary insufficiency, and the result has been very satisfactory as far as it has gone—the length of time has not been sufficient to prove permanent good.

CASE VII.—Mrs. S., aged thirty-four years. Mother died of cancer. Father alive. One sister died of tuberculosis. One sister and three brothers are alive and healthy. From childhood she has been of a very neurotic disposition. Up to her first menstrual period she had what she calls "spasms;" during them she was unconscious. These lasted from her ninth to her fourteenth years. For the last nine years she had fits of mental depression. About one year ago she had a hysterical attack in which she lay for a time in a trance-like state, unable to speak but conscious of surroundings. Since then, after each menstrual period, she has had severe headaches, vomiting, hysterical spells in which she lies as if in a faint, but conscious of everything. She complains of being easily tired, of inability to concentrate her thoughts, and of numbness and tingling in her fingers. She is habitually constipated and passes but little urine. She complains bitterly of headache and dizziness, and fears she will become insane. Her emotions are easily aroused and she cries at the least provocation.

Patient is 25 pounds over weight. Her heart is inclined to tachycardia. Breathing is sighing at times. Abdomen is pendulous, flabby, and fat. Otherwise her condition is normal except certain stigmata of hysteria, such as hypesthesia of half her body, irregularity of color fields, diplopia at times.

Treatment was directed against her constipation and likewise against the hysterical element that was so prominent in her case; she promptly recovered from the latter. In time the proper hygiene of her intestinal tract and kidney elimination bore fruit, and she become free from the neurasthenic element as well.

CASE VIII.—Mrs. W., aged thirty-six years. Both parents were rheumatic. Her father had heart and kidney disease.

She has been married seventeen years. Seven years ago she was operated upon for the removal of one ovary. The same year she developed asthma which has been present at times ever since. She has always been of a nervous, worrying disposition.

Complains of asthma, mental depression, and fits of crying. She is easily tired. She has worried a great deal about her husband's health. Her bowels are constipated and she is passing only thirty-two ounces of urine in twenty-four hours.

Her symptoms are not attended with much distress, but are gradually becoming more severe. Heart and lungs are normal. No abnormalities of position of viscera noted. Abdomen is pendulous. There is some asymmetry noted. There are no gross stigmata of hysteria.

Examination of urine at the Philadelphia Clinical Laboratory shows indican very high; otherwise normal.

After treatment that was principally dietetic and hydrotherapeutic together with massage and regulated exercises, she became much better. Nine months later examination of her urine showed a normal output of indican.

In the above cases certain points stand out prominently. The first is hereditary taint and a neuropathic susceptibility. The second is the symptom of fear in its various phases—so common in intestinal diseases. The third and most important as far as treatment is concerned, is the constant condition of intestinal putrefaction that has had to be covercome before any relief was achieved; this was in many of the cases associated with insufficient elimination of urine. In cases of this kind there is often a hysterical taint engrafted on the original trouble that must be considered in treatment.

THE INDICAN REACTION AS EVIDENCE OF ENTEROGENIC INTOXICATION.

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IT is conceded that there is great danger in removing any symptom from its clinical surroundings for the purpose of weighing its intrinsic worth; but if there is sufficient evidence to formulate working rules, that danger should not prevent us from seeking to study limitations. The danger is probably no greater with any other clinical test than it is with the Jaffé or Obermeyer reaction in the urine. Indican is present in excess so frequently, not only as